

# City of Amesbury

## Community Resilience Building

### Summary of Findings



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# EXECUTIVE SUMMARY

In accordance with Executive Order 569, which seeks to build resilience and adapt to the impacts of climate change, the City of Amesbury, Massachusetts is pleased to submit this Summary of Findings Report. In 2018, the City of Amesbury applied for and received a Municipal Vulnerability Preparedness (MVP) program grant from the Massachusetts Executive Office of Energy and Environmental Affairs (EEA) to complete a vulnerability assessment and action-oriented resilience plan (Findings Report) following the Community Resilience Building (CRB) framework developed by The Nature Conservancy. The CRB framework uses a community-driven workshop process to identify climate-related hazards, community strengths and vulnerabilities, and develop solutions to address these considerations. Completion of the CRB process enables the City to achieve MVP community designation status from the EEA and receive preference for future state grant under the MVP program or other participating funding entities. Amesbury was also granted EEA funds to conduct a Natural Resources Infrastructure Assessment (NRIA) project, which entailed assessing the existing natural resource infrastructure assets within Amesbury and evaluating their climate vulnerability and/or resiliency and their capacity to contribute to Amesbury climate resiliency goals. Results of this NRIA project were shared with CRB Workshop attendees at the Workshop and are reported in the Amesbury Natural Resources Infrastructure Assessment Report (Amesbury NRIA Report).



*Left: Community workshop participants brainstorm vulnerabilities within Amesbury.  
Right: A kayaker on the Powwow River near downtown Amesbury; Source: Andrew P. Wilson*



# COMMUNITY RESILIENCE BUILDING PLANNING AND WORKSHOPS

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The CRB process began with the establishment of a Core Team comprised of Town Staff from a variety of departments and a Community Member. The Core Team held strategic planning sessions on September 12, 2018 and January 24, 2019. Core Team meetings involved developing a broad understanding of the Hazards, Vulnerabilities, Strengths that characterize the City of Amesbury, identifying a list of Preliminary Resilience Actions that the community could consider at the CRB Workshop, and developing Core Team understanding of the CRB process. Core Team meetings were used to prepare for the upcoming CRB Workshop and to identify the goals of the workshop within the context of community interests and needs. The Core Team decided that it was important to use the workshop as a mechanism to engage with the community using interactive media platforms, including a GIS community data viewer prepared specifically for the workshop and interactive demonstrations of the Massachusetts Data Clearinghouse Website, [resilientma.org](http://resilientma.org) and The Nature Conservancy's Resilient Land Mapping Tool Website, <http://maps.tnc.org/resilientland/>.

One full day Community Resilience Building Workshop was held on March 7, 2019. Workshop participants included a diverse set of community stakeholders from a variety of municipal departments, representatives from Senator DiZoglio's office, the Amesbury City Council, National Grid, the Merrimack Valley Planning Commission, local businesses, the Amesbury Chamber of Commerce, and local interest groups such as the Lake Attitash Association, Clark's Pond Watershed Association, Our Neighbor's Table, and Pettengill House, Inc. The CRB Workshop followed the format outlined in the "Community Resilience Building Workshop Guide". The workshop started with presentations by BSC Group to 1) introduce the concept of the CRB process and the agenda for the workshop, 2) present the results of the Amesbury Municipal Vulnerabilities Preparedness Natural Resources Infrastructure Assessment project, 3) present a slide show of various approaches to Nature Based Solutions, and 4) present instructions for small group work. During breaks and lunch attendees were invited to explore the three engagement and education Adaptation Action Stations. Following the presentations, the large group identified the top 4 – 5 Hazards facing Amesbury, and then broke into three small groups where each group identified Vulnerabilities, Strengths, and Actions and completed a CRB Workshop Risk Matrix. The small groups reported their top 4 – 5 action priorities to the large group, the large group developed a composite list of the prioritized action items, and then the large group selected, via sticky dot voting, the top overall 4 – 5 prioritized action items. Climate resilience planning requires an ongoing effort by community stakeholders. Workshop attendees and other interested stakeholders are encouraged to provide comments, corrections, updates, or additional information of findings transcribed in this report to Tom Barrasso at [Barrassot@amesburyma.gov](mailto:Barrassot@amesburyma.gov). The success of climate resilience planning in Amesbury is contingent upon ongoing participation of community stakeholders.

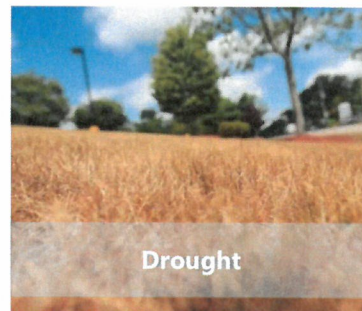
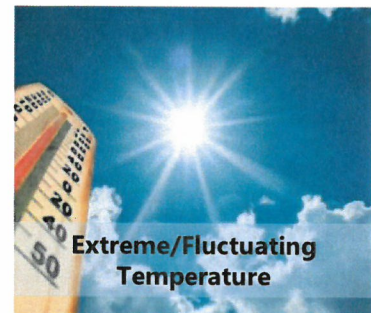


# TOP HAZARDS WITHIN AMESBURY

The City of Amesbury faces several challenges related to establishing resilience to the effects of climate change. For example, over the past couple of decades, Essex County experienced more than 20 extreme weather-related events that triggered federal or state disaster relief. Climate change is expected to increase the occurrence and intensity of natural-hazard related weather events. Identifying and preparing for the hazards most prevalent within Amesbury is the first step to prepare for the effects of climate change.

During the Core Team and CRB planning efforts, stakeholders identified the top natural hazards for the City of Amesbury. Inland freshwater flooding from extreme precipitation events was

identified as the top hazard among most participants. Other extreme weather such as extreme snow, ice and wind events, coastal storm surge, extreme and fluctuating temperatures and drought represented the other climate exposure hazards that were identified and were highlighted as significant concerns for the City. Collectively, it was agreed upon by the group that the City of Amesbury's top hazards present ongoing and cumulative adverse impacts on the community's most important infrastructural, societal, and environmental resources. The Appendix for this report includes a graphic and Merrimack River basin climate projections showing anticipated climate changes for Amesbury over the coming decades.





# CHARACTERIZING A CLIMATE RESILIENT AMESBURY MUNICIPAL VULNERABILITIES AND STRENGTHS

The CRB process involves a robust stakeholder engagement effort and can be used to characterize the vulnerabilities and strengths unique to a given community. The Amesbury CRB process revealed important characteristics that broadly represent the identity and culture of the community. Collectively, these characteristics provide a *snapshot* of the community's vulnerabilities and strengths and is an important starting point to identify community features most at risk to the effects of climate change. The Appendix includes the CRB Workshop Risk Matrix which lists 23 specific climate vulnerabilities and strengths in Amesbury, and also includes base maps used in the CRB Workshop. The vulnerabilities and strengths can be discussed in broad categories as noted below. Most of the vulnerabilities and strengths could be categorized in more than one sectoral grouping (Infrastructure, Societal, and Environmental). For this reason, the Core Team members requested that the MVP Provider (BSC) modify the CRB Workshop Matrix to allow selection of more than one sectoral grouping.

## **Built Infrastructure**

The built infrastructure within Amesbury is characterized by an interdependent network of roads, bridges, dams, municipal buildings (including schools that serve as community shelters), and privately-owned buildings. State and local roadways within Amesbury are often vulnerable to flooding, and some of which are located along important local and regional emergency evacuation routes or provide access to community shelters. All of the dams in Amesbury are owned by the City, other than the Bailey's Pond dam, which is privately owned. These dams contribute to water quality and flood control issues across the community. Publicly and privately-owned buildings in the downtown business district are a source of urban heat island effect. Privately owned buildings throughout the community provide homes to residents. A National GRID (NGRID) power station is located on the banks of the Powwow River in downtown Amesbury. The riverbanks are eroding, potentially putting the security of the power station at risk. In downtown Amesbury, the Powwow River is at the nexus of inland precipitation-driven flooding and coastal storm surges, thereby exacerbating riverbank erosion and flooding. The city wastewater facility discharges to the Merrimack River, which exacerbates water quality issues.

## **Built Infrastructure**

Roads

Bridges

Dams

Critical Municipal Buildings/Schools

Private Buildings

Evacuation Routes

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### **Water Management Infrastructure**

Flooding in much of Amesbury is primarily a result of precipitation and storm water runoff overwhelming the capacity of natural and structured drainage systems to convey water. Because the Merrimack River is tidal, parts of Amesbury, including the downtown area and other areas adjacent to the Merrimack, Powwow and Back Rivers, are subject to increased flooding during coastal storm surges, and ultimately are vulnerable to sea level rise. Under extreme precipitation and/or coastal storm conditions the drainage system becomes overburdened and street and property flooding result. In some cases, roads that serve as evacuation routes, routes to community shelters, or routes of egress from specific neighborhoods are already experiencing flooding, and this is anticipated to worsen as the climate changes. As an example, the houses on Pleasant Valley Road, which parallels the Merrimack River, already can become isolated during a severe storm event. Workshop participants agreed that the stormwater drainage structures throughout the community are likely undersized and often cannot meet the demands of runoff from extreme precipitation and/or inland and coastal flooding events. Additionally, there was concern that portions of evacuation routes and routes to shelters that are vulnerable to current and future flooding events haven't been fully identified, or if they have been identified, planning to address the flooding problem has not been completed or integrated into emergency response plans.

### **Water Management Infrastructure**

Stormwater Drainage

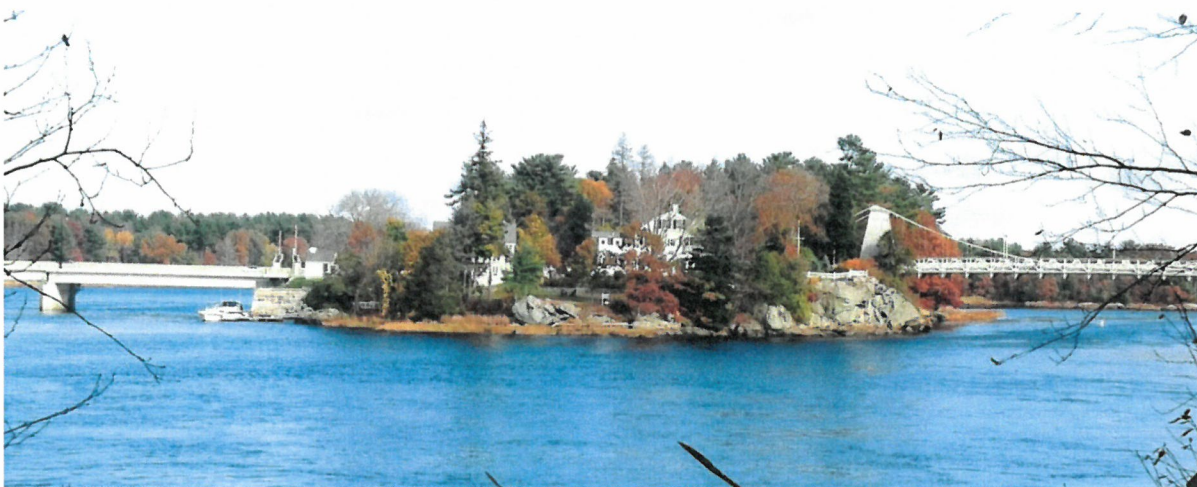
Natural Infrastructure

Wastewater Treatment

Drinking Water

Culverts

Dams



*Deer Island, located within the Merrimack  
River  
Source: Newburyport Area Homes*



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### ***Emergency Preparedness/Community Preparedness/Vulnerable Populations***

Emergency management for the City of Amesbury entails coordination between the Police Department, Fire Department, and the Department of Public Works, as well as other departments such as the Health Department as needed. In addition to preparing for the welfare of Amesbury citizens during emergencies, Amesbury must also consider its role regionally, as evacuation routes from adjacent towns pass through Amesbury. Currently, there is no centralized emergency communications system or facility, and the Department of Public Works operates solely via cellular phone. Currently, there is no coordinated evacuation strategy and plan for coordinated response for locations within the city that become isolated by flooding during a severe event. An overall disaster plan, the physical resources needed to implement such a plan, and public outreach materials are lacking. Evaluation of shelter facilities to meet current evacuation and shelter codes is needed. The need to integrate climate into the Hazard Mitigation Plan was recognized, as was the need to assess evacuation routes. Continuing to build upon established decision-making processes and operations is an important aspect of ongoing climate resilience efforts. Given the vulnerabilities that Amesbury faces as well as its regional role, Core Team members felt that this represents a significant vulnerability.

Additionally, CRB workshop participants identified the lack of community education, outreach and awareness about climate resiliency as a vulnerability in the City of Amesbury. While significant work has been done to promote civic engagement across the public, private, and non-profit sectors in Amesbury, workshop participants viewed the absence of community outreach and education about climate resiliency as a limitation to achieving its climate resilience goals. While there are many community-centric public, private, and non-profit entities engaged in community issues, there is a recognized lack of climate change preparedness and social networks to address the challenges presented.

### **Emergency and Community Preparedness**

Centralized Emergency  
Communications

Evacuation Plan

Communication Plan

Emergency & Non-Emergency  
Outreach

Community Networks and  
Education

Informational Technology  
(cellular applications and  
websites)

Regional Coordination

Coordination with State  
Agencies



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## ***Natural Resources Management***

Workshop participants identified the many natural resources in Amesbury that contribute to water management (both quantity and quality), storm damage prevention and heat mitigation, including the Merrimack, Powwow, and Back Rivers, Lakes Attitash and Gardner, Clark's Pond and Woodsom Farm, as well as smaller parks, downtown trees, privately held forested land, wetlands, floodplains and conservation land as community strengths, and in some cases, also as vulnerabilities. As a result of the Core Team meetings, Natural Resources Infrastructure Assessment meetings and site walk, and CRB Workshop, members of the Amesbury community gained a greater understanding of the relationship between these natural resources, the threats from climate change, and community climate resilience.

## ***Local Regulatory Structure/Planning***

The City of Amesbury has a variety of ordinances and policies that serve to direct and guide planning and development throughout the municipality, to protect natural resources such as wetlands and waters, and to plan for hazard mitigation. These existing regulatory and planning instruments represent a strength, but one that can be further strengthened by incorporating climate change, and by updating.

### **Natural Resource Management**

Zoning Ordinance Updates

Wetland & Floodplain  
Conservation and  
Restoration

Increase Tree Canopy

Bank Erosion

Water Quality

Dam Management

Open Space Connectivity

Invasive Species/Algal  
Blooms

Low-Flow Conditions



### **Local Regulatory Structure & Planning**

Open Space Plan

Master Plan

Hazard Mitigation Plan

Climate-Resilient Ordinances  
& Policies: Zoning, Wetlands,  
Floodplain

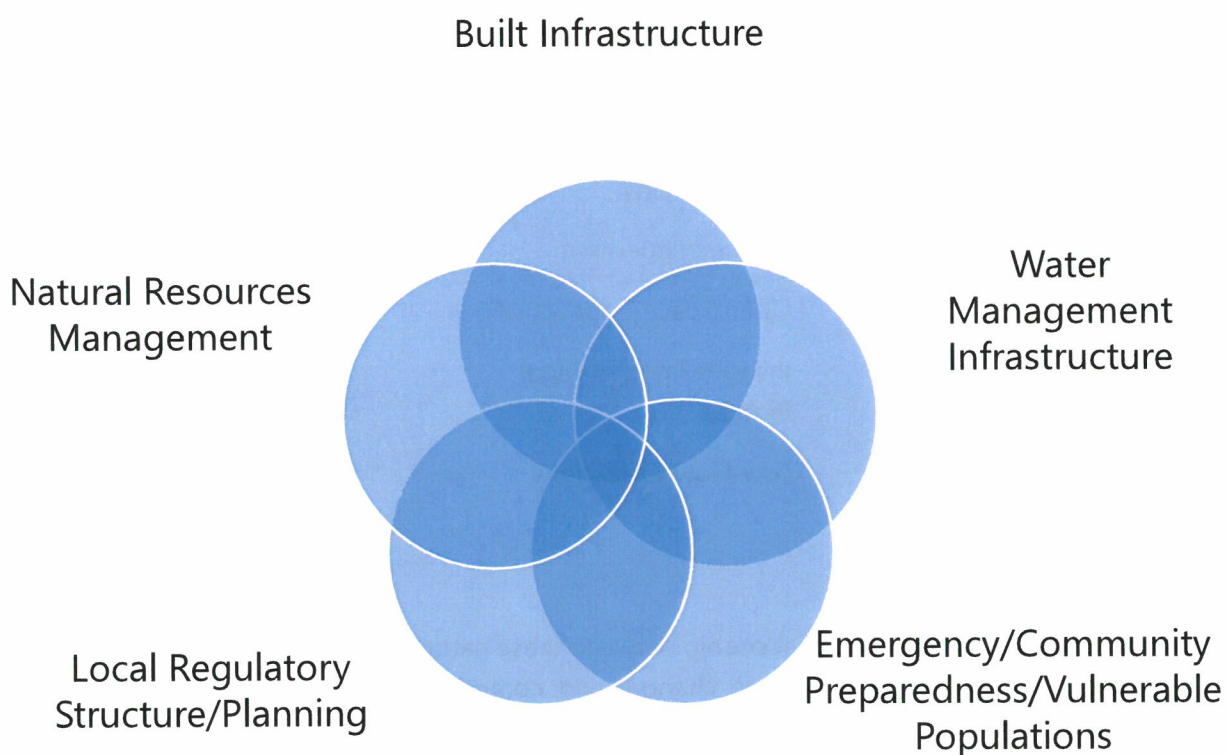
Invasive Species

Cross Departmental Planning  
Partnerships



# CATEGORIZING AND PRIORITIZING CHALLENGES AND ACTIONS

Workshop participants identified more than 23 actions (most of which included sub-category actions) as part of the CRB process. These actions can be considered in five categories based on a combination of community characteristics (i.e. strengths and vulnerabilities) and solutions identified by workshop participants. During the Core Team and Natural Resource Infrastructure Assessment Team meetings and the CRB workshop, an emphasis was placed on the interdependence of these categories that allowed for the development of climate resilience solutions that span infrastructural, societal, and environmental features. Through this lens, overlapping solutions that provide co-benefits were identified and prioritized.

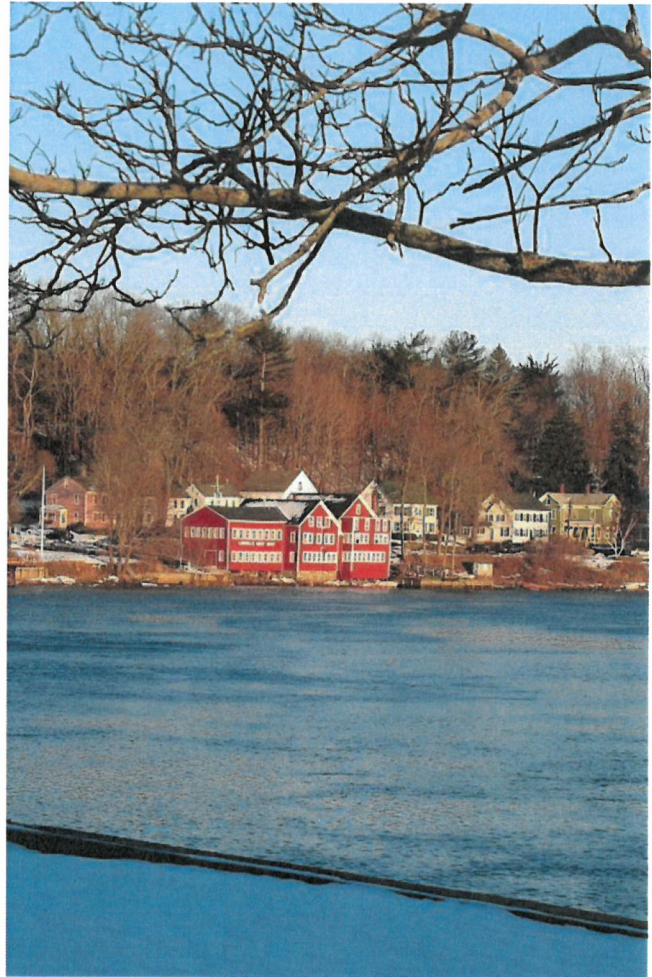




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### **Built Infrastructure**

When developing a prioritized list of climate resilient actions, CRB Workshop participants and Core Team members supported initiatives that incorporate green infrastructure, low-impact design, energy efficiency, renewable energy, relocation of electrical utilities belowground, and decentralizing power sources. The City of Amesbury feels strongly about improving the resilience of its community shelters which are located at the High School, Middle School, and Elementary School. Approaches to improve the resilience of community shelters include reducing the risk of flooding to roads that access the community shelters, improving the emergency response communications system, and improving emergency support for the elderly, English language learners, young children and other vulnerable populations. Notably, the addition of community education about the shelters as a community resource and the application of technological (cellular networks) or energy (renewable sources) redundancy improves these important community resources. This category excludes the town's water management infrastructure because of the unique challenges related to flooding within the community.



### **Water Management Infrastructure**

Through the CRB planning and workshop process, participants gained a new understanding of the connection between natural infrastructure and worsening flooding problems. In particular, there is a new appreciation of the flood storage and water quality ecosystem services provided by wetlands and floodplains at Woodsom Farm (see discussion in Natural Resources Management section below). Natural infrastructure can relieve some of the flooding and water quality pressure on the built infrastructure, and participants saw the value of integrating Nature Based Solutions into climate resiliency plans. Water quality issues were a concern for workshop participants, with concern expressed about introduction of toxins to stormwater during severe storms and flooding events.



